

## Icy Antarctic expedition for Raglan locals

'It's a small world after all' for Clare Beet and Dean Sandwell who found themselves on the same flight to Antarctica to partake in research for the University of Waikato.

Clare Beet, a Waikato University Master of Science student and Dean Sandwell, a Waikato University Earth Sciences Technician, are both born and bred Raglan locals and grew up as neighbours.

The two each visited Antarctica for the first time last month, both for research, but each focusing on quite different aspects of science.

Clare's trip was funded by a New Zealand Post Antarctic Scholarship from Antarctica New Zealand and a Research Institute Scholarship of \$12,000, which she was awarded by the University of Waikato late last year. She is undertaking her research with the University's Environmental Research Institute.

Clare's research involved collecting soil samples, in particular samples containing springtails - a 1.5mm long, six-legged insect-like creature - and mites. Springtails are the largest land-based animal that live year-round in Antarctica and are sensitive to climate-driven environmental changes. To assess the changes in the environment, Clare looked at the subtle differences in the genetic structure of each species, comparing them with other previously examined populations in Victoria Land.

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Waikato University Master of Science student Clare Beet and Waikato University Earth Sciences Technician Dean Sandwell visited Antarctica for the first time in January, to undertake scientific research.

## Applications open for Science and Engineering Open Days



Students at the 2014 Science Open Day enjoyed workshops in the Chemistry laboratories that involved experimenting with liquid nitrogen, including using the gas to deflate, then reinflate a balloon.

Spend the day on campus with staff and students and experience hands-on workshops and lab demonstrations.

Both full-day events are suitable for Year 11, 12 and 13 school students, as well as adult learners.

Attend just one event or register your interest for both. Numbers are limited, so register now!

Science Open Day (Wednesday 8 July), covers the Bachelor of Science and the Bachelor of Science (Technology) degrees, including the majors of Biological Sciences, Chemistry, Computer Science, Physics, and Earth Sciences.

Engineering Open Day (Thursday 9 July), covers the Bachelor of Engineering (Honours) degree, including the programmes of Electronic Engineering, Software Engineering, Chemical and Biological Engineering, Materials and Process Engineering and Mechanical Engineering.

Register online from 22 May: [www.sci.waikato.ac.nz](http://www.sci.waikato.ac.nz)

Registrations close: 19 June 2015



# Antarctic adventure - continued



Waikato University Master of Science student Clare Beet and Waikato University Earth Sciences Technician Dean Sandwell visited Scott Base in Antarctica, to undertake scientific research.

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"We had a really successful trip and got samples from some amazing places - a few of which may be the first time springtails have been collected there. The whole experience was just surreal. Every time I looked around I was 'wowed' all over again," says Clare.

## Monitoring soil conditions

Technician Dean Sandwell was in Antarctica to service several long-term soil-climate monitoring stations, as part of a cooperative project with Landcare Research, United States Department of Agriculture and the University of Waikato.

"Antarctica is the coldest place on Earth with 98% ice cover, at an average of 2100m thick and is the Earth's largest fresh water reserve. Of the ice-free ground, only 0.3% is available for soils to form. Relatively little is known about soil climate in Antarctica and the effect that it has on pedogenic processes (processes that lead to soil formation) and viability of microorganisms, invertebrates and plants. Most importantly this data provides base-line atmospheric and soil climatic information in an area sensitive to global climate change," says Dean.

## Life in Antarctica

Getting to Antarctica is no ordinary journey.

Dean and Clare flew eight hours on a United States CL-130 military plane, with retractable skis to land on the ice. On arrival they underwent survival training and spent the night sleeping in an ice trench.

For the remainder of their stay Dean had the luxury of staying at Scott Base with daily helicopter flights to climate station sites. "Flying in the helicopter was amazing. Watching killer whales stalking the sea ice edge while penguins dashed for a safe water entry was a once in a lifetime experience," says Dean.

In contrast, Clare and her team were camping in a remote field location north of the Dry Valleys, over 250 km from Scott Base.

"After almost a week of isolation the noise of an approaching helicopter became one of my favourite sounds, especially as it meant more food and drink rations. Flying in the helicopter surrounded by some of the most picturesque landscapes Antarctica has to offer was definitely one of the highlights," says Clare.

## Famous faces

Clare and Dean flew into Antarctica with photographer Trey Ratcliff who they also spent time with during their stay. One particular image taken of Clare, titled *Girl in Antarctica* has been particularly popular on Ratcliff's website, collecting millions of hits from viewers around the world.

Visit Trey Ratcliff's website to view the photo: <http://www.stuckincustoms.com/2015/02/01/girl-in-antarctica/>

# Summer School applications open soon



Applications for the Hill Laboratories Waikato Science & Engineering Summer School will open on 22 June.

The Summer School will run 29 November - 4 December 2015. The event is open to Year 12 students within Rotary District 9930, who have an interest in science and engineering, and who will be going on to study at Year 13 level in 2016.

In 2014 the journey began with a full-on two day field trip during which students explored the areas of Kawhia and Waitomo. The group searched for fossils at Puti Point, collected zoo plankton samples at the Kawhia jetty and enjoyed a walk through the Ruakuri Caves.

The remainder of the week was spent in Waikato University's science and engineering labs, analysing samples, conducting experiments and building prototypes to better understand the

environmental and social changes the local coastal and cave environments have undergone over time.

Previous Summer School field trips have explored areas such as the Waikato River, Rotorua, Raglan and Karangahake Gorge.

Applications must be lodged through your local Rotary Club. Participants will be chosen based on high academic achievement, intention to pursue science or engineering as a career, a well-rounded personality, a good attitude and work habits, and wide community interests.

Details will be sent to secondary schools in Rotary District 9930 and will be available online from 22 June.

For more information and to apply online, visit [www.sci.waikato.ac.nz/sciencesummerschool](http://www.sci.waikato.ac.nz/sciencesummerschool)

# New booklets provide need-to-know info

If you're intrigued by the world around you and enjoy biology, chemistry or physics, a degree in science may be what you're looking for.

Alternatively, if you thrive in a team environment where problem solving is key and you're strong in science and mathematics, a career in engineering may be for you.

Our two new booklets *Study Science at Waikato* and *Study Engineering at Waikato* give a great overview of our degrees, work placement and scholarship opportunities, plenty of profiles telling the stories of our current students and graduates, and details on each of the majors and programmes available when studying science or engineering at Waikato.

You can also read about all the reasons why you should study at Waikato University specifically, including our great facilities, regular field trips, excellent student support, world-class research and extra-curricular activities such as clubs and societies.

View the booklets online: [www.sci.waikato.ac.nz/facultypublications](http://www.sci.waikato.ac.nz/facultypublications)

Or contact [science@waikato.ac.nz](mailto:science@waikato.ac.nz) to request a hard copy.



Out now: Interested in studying science or engineering at Waikato University? Our two new booklets are the ideal resource to guide you.

# Sustainability focus for Indonesian event



University of Waikato students Mark Savage and Grace Nolan visited Indonesia to attend CommTECH Insight, an event focused on improving sustainability in developing countries.

Two students from the Faculty of Computing & Mathematical Sciences have spent 10 days in Indonesia at an event focused on improving sustainability in developing countries.

## CommTEch Insight

CommTECH (Community and Technological Camp) Insight was attended by Bachelor of Computing and Mathematical Sciences (BCMS) student Mark Savage and Bachelor of Science (BSc) student Grace Nolan.

The two travellers journeyed to Surabaya, Indonesia's second largest city to take part in the event. During their stay they were hosted by local university, Institut Teknologi Sepuluh Nopember (ITS).

"The purpose of CommTECH Insight was to explore, in depth, the culture and history of Surabaya and to use the city as a case study to learn about

sustainable development, both from an environmental and economic point of view," says Mark.

Grace used the trip as an opportunity to immerse herself in another culture. "I was able to form connections with people who have very similar study interests to me, but who come from very different backgrounds, which is the ideal environment for innovation. Due to the relationships formed I think there is a strong possibility for research collaboration between me and ITS in the future," says Grace.

## Sustainable practices

Both students could see major benefits to society if sustainable practices are embraced on a larger scale, particularly within the information technology sector.

Mark and Grace were also impressed by the cultural and scenic highlights on offer at CommTECH, including batik, white water rafting, Indonesian food and dancing, and a trip to an active volcano.

## Why Waikato?

Mark was home-schooled for the majority of his school years, and spent his last two years of school at Bethlehem College in Tauranga.

"I chose Waikato University for its location and because at the time it was the only university in New Zealand to offer mathematics and computer science in a single bachelors degree."

Grace is a former Waikato Diocesan School for Girls student. She began tertiary study at Victoria University, before transferring to the University of Waikato. As part of a BSc she is majoring in Computer Science, with supporting papers in graphic design, philosophy, psychology and Japanese.

[Google "CommTECH Insight" to find out more about future events and to view a video of highlights from CommTECH Insight 2015.](#)

# Managing environmental sustainability in Qatar

A University of Waikato science graduate is in the Middle East working to reduce the environmental impacts of a major sea port project.

Peter Longdill is an Environmental and Sustainability Manager as part of a government steering committee for the New Port Project in Qatar.

"I'm involved in the creation and management of processes to ensure that the project adheres to its environmental objectives and obligations. This covers everything from air quality to vibration, noise, soils, groundwater, coastal processes, oceanography and marine ecology," says Peter.

Peter completed a Master of Science (MSc) and a PhD at the University of Waikato, following a two-year stint in Australia as a GIS analyst.

"I knew specifically the subject area I was interested in and selected Waikato University because of the excellent reputation of the Coastal Marine Group's research and staff, great relationships with industry, and a huge selection of field survey equipment with the technicians and capabilities to use it."

He says that one of the major highlights of his current job has been seeing such a huge project from a green-field site, through to a major construction site with around 8000 persons working on site.

"Another highlight was my involvement in the relocation of a number of hard and soft corals and mangrove trees which could not be avoided during the port planning."

The relocation programme involved the removal, transport and reattachment of approximately 10,000 healthy hard coral colonies.

Peter's study focus while at Waikato University was coastal physical oceanography with a mixture of water quality and ecology.

"My degrees gave me a sound understanding of the natural sciences and a



University of Waikato science graduate Peter Longdill assisting in the deployment of a current meter as part of his job as the Environmental and Sustainability Manager for the New Port Project in Qatar.

good amount of scientific 'common sense'. My work at Waikato helped me to be able to 'talk the scientific talk' while the applied nature of the research also helped me to relate to business interests and commercial realities associated with applied science – that combination has helped me a lot."

Read more graduate stories: [www.sci.waikato.ac.nz/study/student-profiles](http://www.sci.waikato.ac.nz/study/student-profiles)

## Awe inspiring career for Waikato grad



Waikato graduate April McMurtrie is enjoying her role as a zoo keeper at Wellington Zoo. Handling the resident cheetah is just one of the highlights. Image supplied by Wellington Zoo.

Handling cheetahs, training giraffes and rearing emu chicks are just a few of the things keeping University of Waikato graduate April McMurtrie busy in her inspiring career as a zoo keeper.

April's main duty is to ensure that all the animals under her care are healthy and living a high-quality, enriched life.

"I prepare and feed-out diets, clean exhibits, and fulfil any behavioural

needs of the animals in my care, such as walking the dingoes daily. I also provide enrichment for variability and variety and to incorporate training and conditioning into the animals' daily lives. For example I train the giraffe to follow a target stick to their crush area for daily weights and to carry out health checks," says April.

Not only does April care for the animals, she is also tasked with educating the zoo's human visitors. "I give daily talks and take visitors behind the scenes for animal encounters. I aim to empower visitors to believe in the need for a sustainable co-existence between wildlife and people."

April was offered a zoo keeper position at Wellington Zoo following a Bachelor of Science (Technology) at Waikato University. She majored in Animal Behaviour and Biological Sciences and as part of the degree spent a year completing a work placement at Hamilton Zoo.

The former Te Awamutu College student says the work placement was essentially the beginning of her career. "By completing the placement I had both theoretical knowledge and proven perseverance, while also having an extensive background in practical, industry-specific experience. Without this, I feel I would not have been able to hit the ground running in the industry as I have."

For April the biggest highlight of her job is the opportunity she has been given to build incredible bonds with amazing animals such as giraffe and cheetahs. "Sharing a life with such awe inspiring animals is so humbling and so fulfilling that I couldn't imagine myself in any other career."

Read more graduate stories: [www.sci.waikato.ac.nz/study/student-profiles](http://www.sci.waikato.ac.nz/study/student-profiles)



University of Waikato lecturer Nihal Kularatna with his new supercapacitor-based surge protector, which is now on the market.

A supercapacitor-based surge protector, the S-TViQ, invented by University of Waikato Electronic Engineering Senior Lecturer Nihal Kularatna, has made it to commercialisation.

Following a three-year research and development partnership, a license deal has been established with Thor Technologies, an Australian manufacturer of power protection and management products. Thor worked with the University of Waikato and WaikatoLink to develop and commercialise the supercapacitor-based surge protection product, which is now on the market.

# New supercapacitor surge protector hits the market

Mr Kularatna's enhanced surge protection technology emerged as one of three winning ideas in the WaikatoLink 2010 Jumpstart competition.

WaikatoLink CEO Duncan Mackintosh says the new technology is an excellent example of the value that can be created from strong partnerships between the University, WaikatoLink and industry.

While working on the project, Mr Kularatna discovered that unlike existing surge absorption products that have a limited lifetime which degrade with every surge, supercapacitors can absorb countless power surges without any degradation. He went on to develop a supercapacitor-based circuit with the potential to offer longer lifetime components and superior surge protection than existing products.

"As electronic circuits become more sophisticated, consumer electronic products are becoming more sensitive to power issues such as high voltage surges and spikes," he says.

"The S-TViQ is like an electronic shock absorber and can be used for devices such as desktops computers, tablets, TVs and cash registers."

Mr Kularatna was born and brought up in Sri Lanka, which he says is a lightning-prone country.

"I saw a lot of damage done to electrical and electronic equipment in home and work environments, so finding a way to protect this type of equipment from transient surges in power has been a lifelong interest of mine."

Thor Technologies Managing Director George Forster-Jones says the company was excited to launch the Smart TViQ.

"It's a unique new surge protector that uses supercapacitor technology as a revolutionary new surge absorption component. Sales are already progressing well and early market feedback has been exceptionally positive."

[Google "S-TViQ" to find out more.](#)

## Alan Turing Prize no enigma for Tom

He's one of the biggest names in Mathematics and Computer Science, and since 1991 has had a university prize named after him.

The Alan Turing Prize is awarded annually to the University of Waikato student who has performed best in a third-year programme of study that includes at least two 300 level papers in Computer Science and at least two 300 level papers in Mathematics. In 2014, the \$300 prize was awarded to Tom Levy.

"Alan Turing established everything we can do today in terms of computational power," says Tom. "He created the subject with his work, which was really impressive. I look up to him and what he did, so it's an honour to be awarded this prize."

The prize was established at the University in 1991 by the then Foundation Dean Associate Professor John Turner, and first awarded in 1992. It was established to encourage students to develop strong joint interests in Computer Science and Mathematics, with Alan Turing's considerable achievements providing an inspiration to them.

Tom moved with his family from Israel to New Zealand in 2003. The 21-year-old is now in his

honours year of a Bachelor of Computing and Mathematical Sciences majoring in Mathematics and Computer Science.

"I'm doing my honours research into lambda calculus, which was invented by Alonzo Church who was Alan Turing's doctoral supervisor, so the prize has real significance for me."

Known as the Father of Computer Science, Alan Turing (1912-1954) was an English mathematician, logician, and cryptanalyst who made fundamental contributions to Mathematics and Computer Science. Turing is most famous for the work he carried out during World War II in breaking German Enigma code messages with his electro-mechanical rotor cipher machine. The recent movie *The Imitation Game* tells his story.

Tom has also just finished a three-month internship with Google in Sydney working on their latest mobile phone services.

Read more graduate profiles from the Faculty of Computing & Mathematical Sciences: [www.cms.waikato.ac.nz/about/our-students](http://www.cms.waikato.ac.nz/about/our-students)



Computer Science and Mathematics student Tom Levy has been awarded the Alan Turing Prize.

# New posters in your classroom

We've launched a new advertising campaign to share the inspirational stories of our students and graduates.

Look out for our new posters in your classroom and our ads online.

Teachers and careers advisors: A set of science/engineering posters has been mailed to the HOD Science, and a set of computer science posters has been emailed to the HOD Computing at schools in Northland, Auckland, Waikato, Bay of Plenty, Taranaki, Whanganui, Coromandel, Manawatu, Hawke's Bay and Poverty Bay.

Please contact [science@waikato.ac.nz](mailto:science@waikato.ac.nz) to request additional copies for your school.

## The future is calling for the know-how of engineers

Mahonri Owen is answering that call by developing a brain-controlled electro-mechanical robotic hand, which could prove invaluable for trauma patients. Mahonri completed a Bachelor of Engineering (Honours) and is about to finish a Master of Engineering.

Visit [www.sci.waikato.ac.nz/thefutureiscalling](http://www.sci.waikato.ac.nz/thefutureiscalling) to read more.



## The future is calling for the inspiration of designers

Ellen Clarkson is answering that call, by cleverly combining her expertise in computer graphic design and computer science to revolutionise business practices via custom-designed IT systems. Ellen is a former Fairfield College student.

Visit [www.cms.waikato.ac.nz/thefutureiscalling](http://www.cms.waikato.ac.nz/thefutureiscalling) to read more.



## The future is calling for the curiosity of biologists

Kiriana Isgrove is answering that call by dedicating herself to improving our understanding of how the biological world works and making the world a better place using genetics. Kiriana is a former Hauraki Plains College student. She completed a Bachelor of Science and has just started a Master of Science.

Visit [www.sci.waikato.ac.nz/thefutureiscalling](http://www.sci.waikato.ac.nz/thefutureiscalling) to read more.

## The future is calling for the innovation of engineers

Former Fraser High School student Kirsten Nel is answering that call by working at Gallagher, one of New Zealand's most successful electronics companies. Here she is developing technologies that help farmers more efficiently and productively manage their livestock.

Visit [www.sci.waikato.ac.nz/thefutureiscalling](http://www.sci.waikato.ac.nz/thefutureiscalling) to read more.



## The future is calling for the insight of Earth scientists

Kit Lawrence is answering that call in Christchurch by working to determine the physical make-up of the ground and analysing the capacity of foundations. Kit is a former student of St John's College and he completed a Bachelor of Science (Technology) majoring in Earth Sciences.

Visit [www.sci.waikato.ac.nz/thefutureiscalling](http://www.sci.waikato.ac.nz/thefutureiscalling) to read more.



## The future is calling for the ingenuity of chemists

Former Katikati College student Cody Wright is answering that call at New Zealand's largest independent analytical laboratory, by using chemistry to help ensure that horticultural products are safe to eat. Cody graduated with a Bachelor of Science and a Master of Science.

Visit [www.sci.waikato.ac.nz/thefutureiscalling](http://www.sci.waikato.ac.nz/thefutureiscalling) to read more.



## The future is calling for the champions of computer science

Claudia Wu is answering that call as an analyst for ANZ, where she is working to help one of New Zealand's largest banks make responsible lending decisions. Claudia is a former Avondale College student and she completed a Bachelor of Science, majoring in Computer Science.

Visit [www.cms.waikato.ac.nz/thefutureiscalling](http://www.cms.waikato.ac.nz/thefutureiscalling) to read more.



# THE FUTURE IS CALLING FOR MASTERS of the DIGITAL UNIVERSE

And Steven is answering that call by transforming the way businesses engage with their customers on mobile, tablet and desktop devices.

Technology is advancing faster than ever before and our world is relying more and more on digital assets to communicate, administrate, process and create. Graduates like Steven, with a deep understanding of the digital world, will become progressively more important and sought after as we look to the challenges and opportunities our increasingly digital future is likely to bring.

Find out more about Steven's story and studying computer science at the University of Waikato at [cms.waikato.ac.nz/thefutureiscalling](http://cms.waikato.ac.nz/thefutureiscalling)

**Steven McTainsh**  
Bachelor of Computing and Mathematical Sciences  
Otumoetai College



THE UNIVERSITY OF  
**WAIKATO**  
*Te Whare Wānunga o Waikato*

Faculty of Computing and Mathematical Sciences  
Rorohiko me ngā Pūtaiao Pāngarau

**Where the world is going**

# Golden scholarship for Sarah



Out of more than 600 applicants, University of Waikato masters student Sarah Appleby is one of just six students in the Asia-Pacific region to receive a Golden Key Graduate Scholar Scholarship, worth \$10,000.

Golden Key is an international honours society which invites members to join based on academic excellence.

Applications for the prestigious scholarship are open only to members of Golden Key, and

successful applicants must be able to demonstrate the usefulness of their research after graduation.

## Master's study at AgResearch

Sarah is carrying out her research at AgResearch in Ruakura, testing the functional potential of bovine embryonic stem cells.

"Embryonic stem cells have really only been fully isolated from mice and rats, however scientists here have developed a method that isolates bovine cells with very similar properties to mice and rat embryonic stem cells. Tests have shown these cells perform well in the lab, so my work will be focused on seeing if they improve cloning efficiency," says Sarah.

"I'm really grateful for the Golden Key scholarship. The type of research I'm doing means I'm often in the lab on the weekend, and fitting in a part-time job would have been really stressful. Having the scholarship is one less thing to worry about."

## Achieving throughout the years

It's not the first scholarship Sarah has received. She was awarded the David Johnstone Charitable Trust Scholarship in 2010; the Anne Shannon Undergraduate Scholarship in 2011 and the University of Waikato Taught Postgraduate Fees Scholarship in 2014. During her undergraduate studies she was top in her class in Statistics for Science, and won Earth Sciences and Bryant Hall Academic Excellence awards.

Originally from Whangamata, Sarah began her studies at the University of Waikato in 2010 with a Bachelor of Science (Technology), majoring in Biological Sciences. She finished with an A+ average in 2013 before beginning her masters study.

She had two placements at AgResearch during her undergraduate degree, spending three months at the Ruakura campus and seven months at the Invermay campus, just outside of Dunedin.

## Interest in reproductive biology

"I really enjoyed the type of work I was exposed to in the reproductive technologies team," says Sarah. "I also had jokingly said when I finished high school that in 10 years' time I'd be working on curing the common cold, so this sort of medical/biological application research has always been something I was interested in."



Glass pulling: Just one of the skills Sarah Appleby learnt during her AgResearch work placements

# What's on

9-10 JUNE 2015

## Waikato Experience Biology (WEB) Days

Year 13 Biology students and teachers are invited to attend seminars and lab work covering topics such as DNA technology, human evolution, biotechnology, and animal behaviour/plant responses to the environment.

Visit [www.sci.waikato.ac.nz/webdays](http://www.sci.waikato.ac.nz/webdays)

11-12 JUNE 2015

## Osborne Physics and Engineering (OsPEn) Days

Talks and practical demonstrations focus on applications of physics, and provide students with examples of how the physics they are learning at school can be used in real life.

Visit [www.sci.waikato.ac.nz/ospendays](http://www.sci.waikato.ac.nz/ospendays)

17 JUNE 2015

## NZIC Analytical Chemistry Competition

Teams of Year 13 students are set an analytical task, requiring accurate and careful analysis of an unknown substance.

Visit [www.sci.waikato.ac.nz/chemcomp](http://www.sci.waikato.ac.nz/chemcomp)

22 JUNE 2015

## Applications open for the Hill Laboratories Waikato Science & Engineering Summer School

Visit [www.sci.waikato.ac.nz/sciencesummerschool](http://www.sci.waikato.ac.nz/sciencesummerschool)

8 JULY 2015

## Science Open Day

This event offers students and their parents the chance to explore the areas of science available to study at Waikato University through hands-on workshops.

Visit [www.sci.waikato.ac.nz/scienceopenday](http://www.sci.waikato.ac.nz/scienceopenday)

9 JULY 2015

## Engineering Open Day

Spend the day on campus with staff and students, experiencing engineering through hands-on workshops.

Visit [www.sci.waikato.ac.nz/engopenday](http://www.sci.waikato.ac.nz/engopenday)

## Contact us

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